UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/700,033	11/03/2003	Greory William Smaus	5500-91600	3398

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EXAMINER
JOHNSON, BRIAN P

ART UNIT	PAPER NUMBER
2183	

MAIL DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

	Application No.	Applicant(s)
Office Action Summary	10/700,033	SMAUS ET AL.
	Examiner	Art Unit	
	BRIAN P. JOHNSON	2183	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _____ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on <u>23 February 2008</u>.
2a) ☐ This action is **FINAL**.   2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) <u>1-23</u> is/are pending in the application.
    4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) <u>1-6, 8-13, 15-17, and 19-23</u> is/are rejected.
7) ☒ Claim(s) <u>7,14 and 18</u> is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.
10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
    a) ☐ All   b) ☐ Some * c) ☐ None of:
      1. ☐ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____.
      3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1.   Claims 1-23 are pending.

Papers Filed

2.   Examiner acknowledges receipt of remarks filed on 13 February 2008.

Claim Rejections - 35 USC § 112

1.   The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly
> claiming the subject matter which the applicant regards as his invention.

2.   Claims 5, 12, and 22 are rejected under 35 U.S.C. 112, second paragraph, as

being indefinite for failing to particularly point out and distinctly claim the subject matter

which applicant regards as the invention. In particular, to say that two values are

proportional does not make any sense unless it is compared to another ratio. For

example, saying that 1 and 5 are proportional is nonsensical. Saying that 1 and 5 are

proportional to 2 and 10 makes sense and is true.

Claim Rejections - 35 USC § 103

1.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

2.   Claims 1-5, 8-12, 15 and 19-23 rejected under 35 U.S.C. 103(a) as being

unpatentable over Jourdan (U.S. Patent No. 6,848,031)

1.   Regarding claims 1, 8, 15, and 23 Jourdan discloses a microprocessor,

comprising: a system memory (reference 29), an instruction cache (reference 22); a

trace cache (reference 26); and a prefetch unit coupled to the instruction cache and the

trace cache;

Jourdan discloses a first level trace cache that, when a miss occurs, a second

level cache is accessed (col 3 line 64 to col 4 line 6) as well as a method of accessing

the memory when a cache miss occurs (col 4 lines 3-6). Jourdan fails to disclose that in

a two level system (trace cache and instruction cache) that a line of instructions are

prefetched into the instruction cache when they both miss.

Examiner takes Official Notice that it is common for a line of instructions to be

prefetched into the instruction cache from memory when a cache miss occurs. This

was likely the intention of Jourdan, but there is not enough detail to show this

definitively.

Jourdan would have been motivated to do this in order to allow the instruction

cache to work in a commonly used and highly efficient manner to make fetches more

efficient.

It would have been obvious at the time of the invention for one of ordinary skill in

the art to take the processing system of Jourdan and add a third level of cache

hierarchy, from the memory to the instruction cache. As a result, the remaining

limitations would be met. For example, when a required instruction is evicted from the

trace cache and does not exist in the instruction cache, a prefetch will occur from the

memory to the instruction. If this entry was not evicted from trace cache, then the

prefetch would not occur. Therefore, it follows that this prefetch is "in response to a

trace being evicted from the trace cache."

2.   Regarding claims 2, 3, 9, 10, 19 and 20, Jourdan discloses the processor of

claims 1, 8 and 15, wherein the prefetch unit is configured to fetch a line into the

instruction cache comprising instructions that correspond to operations that precede

and follow a branch in the evicted trace (col 2 lines 40-46).

During circumstances with more than one branch instruction, it will be common

and likely that the instructions corresponding to a fetched line precede and follow a

branch instruction.

3.   Regarding claims 4, 11 and 21, Jourdan discloses the microprocessor of claims

1, 8 and 15, wherein the prefetch unit is configured to prefetch a plurality of lines of

instructions into the instruction cache in response to the trace being evicted from the

trace cache. *This limitation appears to be already included in the independent claims.*

4.   Regarding claims 5, 12, and 22, Jourdan discloses the microprocessor of claims

4, 11, and 21, wherein the prefetch unit is configured to fetch a number of lines that is

proportional to the number of branch operations comprised in the evicted trace.

5.   Claims 6, 13, 16 and 17 rejected under 35 U.S.C. 103(a) as being unpatentable

over Jourdan in view of prior art.

6.   Regarding claims 6 and 13, Jourdan discloses the microprocessor of claims 1

and

        Peled fails to disclose a cache that checks for duplicate information within the

cache to inhibit the storing said duplicate information.

        Examiner takes Official Notice that it would have been obvious at the time of the

invention for one of ordinary skill in the art to take the invention of Peled and utilize a

cache system that, when presented with information to store, checks if that information

already exists and inhibits duplicate storage. IN particular, within the invention of Peled,

the combination would check when there is an eviction from the trace cache.

        Regarding the motivation, Examiner asserts that this technique is extremely

common practice within cache systems. Storing the same information within different

portions of a cache is a waste of resources that can create a detriment to the

processing system with regards to space, cost, power and speed.

7.   Regarding claim 16, Peled discloses the method of claim 15, further comprising

checking the instruction cache for lines of instructions comprising the instructions

corresponding to the evicted trace (col 3 line 64 to col 4 lines 6)

8.   Regarding claim 17, Peled discloses the method of claim 16, further comprising

inhibiting the fetching of the line of instructions into the instruction cache if the line of

instructions is stored in the instruction cache.

The functionality of claim 17 follows the combination as described above.

Allowable Subject Matter

9.   Claims 7, 14, and 18 are objected to as being dependent upon a rejected base

claim, but would be allowable if rewritten in independent form including all of the

limitations of the base claim and any intervening claims. The limitations of these claims,

in combination with the independent claims are not found in any art of record.

Conclusion

The following is text cited from 37 CFR 1.111(c): In amending in reply to a

rejection of claims in an application or patent under reexamination, the applicant or

patent owner must clearly point out the patentable novelty which he or she thinks the

claims present in view of the state of the art disclosed by the references cited or the

objections made. The applicant or patent owner must also show how the amendments

avoid such references or objections.

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Brian P Johnson whose telephone number is (571) 272-

2678. The examiner can normally be reached on M-F, 8-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Chan can be reached on (571) 272-4174. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Eddie P Chan/

Supervisory Patent Examiner, Art Unit 2183